3.10 Water Quality

Marine water quality is a function of natural and anthropogenic (human-caused) processes. Natural factors include climate (winds, tides, rainfall, upwelling processes), and biological processes such as phytoplankton blooms. Primary anthropogenic factors include:

- Urban stormwater runoff
- Treated wastewater effluent
- Industrial discharges
- Agricultural practices (e.g., tilling that results in wind and water erosion of soil; applications of fertilizer, pesticides and herbicides; runoff from dairy farms)
- Releases from failing septic systems
- Land management practices that affect runoff quantity and quality
- Other point and non-point source releases of contaminants.

Within the area encompassed by the Puget Sound Chinook ESU, over 1,300 streams and river segments and lakes do not meet Federally approved, state and Tribal water quality standards and are now listed as water quality limited under Section 303(d) of the Clean Water Act (DOE 2004). Tributary water quality problems contribute to poor water quality where sediment and contaminants from the tributaries settle in mainstem reaches and the estuary. The Washington Department of Ecology rated Puget Sound water quality as generally good in most areas (Newton et al. 2002). The report identified a number of specific locations where water quality has declined, due to low dissolved oxygen, fecal coliform bacteria contamination, or an indication of sensitivity to eutrophication based on persistent layering of waters of different densities (stratification) or nutrient conditions. Eutrophication is an increase in nutrients, typically nitrogen or phosphorus, that can result in very large algal blooms. As the nutrients are depleted, the algae die and sink to lower depths. The decomposition of the dead algae depletes the dissolved oxygen in the water, reducing the ability of the water to support life. In Puget Sound, eutrophication occurs due to a combination of weather patterns and nutrient inputs, typically from runoff or wastewater sources, like wastewater treatment plant discharges or failing septic systems. Areas of highest concern include southern Hood Canal, Budd Inlet, Penn Cove, Commencement Bay, Elliott Bay, Possession Sound, Saratoga Passage, and Sinclair Inlet. The Puget Sound Water Quality Action Team (PSWQAT 2002) provides a similar overview of water quality in Puget Sound with a somewhat different focus that includes toxic contaminants and biological resources. In particular, this

report identifies areas with sediment contamination due to polycyclic aromatic hydrocarbons (PAHs) – the most likely contaminants from vessel operations.

The potential for water quality impacts associated with implementing the Proposed Action or alternatives is discussed in this Environmental Impact Statement in the context of vessel operations for commercial, tribal, and recreational fishing. Potential impacts could occur in the form of turbidity and sedimentation, and/or non-point source pollution from hydrocarbon spills or releases. Estimates of the amount of vessel traffic on Puget Sound associated with fishing are not readily available, so it is not possible to quantify the impacts of fishing versus other boating activities. However, there were 191,426 licensed vessels in 2002*, with a corresponding 293 licensed non-treaty commercial fishers. Using these figures, non-treaty commercial fishing vessels represent only one-tenth of one percent of the total vessels registered by Washington Department of Licensing in Puget Sound. ~~However,~~Because salmon fishing is just one of many boating activities that take place on Puget Sound, ~~so~~ it is not expected that fishing operations, either sport or commercial, will be a major factor in vessel activity.

3.10.1 Turbidity and Sedimentation

Vessel operations in and around moorage facilities and in other shallow areas have the potential to stir up bottom sediments and cause short-term increases in turbidity in marine and freshwater areas. Boat wakes may contribute to bank erosion in some areas.

3.10.2 Non-Point Source Pollution

The most likely pollutants attributable to the operation of fishing vessels are in the class of compounds known as polycyclic aromatic hydrocarbons (PAHs). These include diesel fuel, gasoline and lubricants that might be spilled directly into the water; unburned fuels and oils associated with the operation of two-cycle engines such as outboard motors; and deposition of the products of combustion from larger vessel engines. PAHs have limited solubility in water (Varanasi 1989), and are typically not found free in the water column. Lighter fractions tend to come to the surface where they evaporate. Heavier versions tend to sink to the bottom and adsorb to sediments. These contaminants can reenter the water column if sediments are disturbed, and are known to cause problems for benthic organisms and fishes that are in direct contact with the sediments (Puget Sound Water Quality Action Team 2002).

---

* Treaty-Indian vessel owners are not required to register with Washington Dept. of Licensing. The count of fishers includes licenses issued to non-treaty-Indian purse seine and gill net gears, and does not include fixed reef net gear.

Central and South Puget Sound have been identified as areas where PAH contamination is significant (Puget Sound Water Quality Action Team 2002). This contamination primarily resulted from historic use of creosote (a wood preservative) at specific locations, stormwater runoff from urban areas (petroleum product residues in runoff from parking lots and roadways), and the byproducts of combustion (wood burning, coal burning, and vehicle exhaust). Existing water quality problems attributable to polycyclic aromatic hydrocarbons are the result of a multitude of small, chronic contaminations, to which the operation of fishing vessels likely contributes.